BACKGROUND DOCUMENT FOR THE

PROPOSED COMPREHENSIVE PROCUREMENT GUIDELINE (CPG) V

AND

DRAFT RECOVERED MATERIALS ADVISORY NOTICE (RMAN) V

U.S. Environmental Protection Agency
Office of Solid Waste
Ariel Rios Building
1200 Pennsylvania Avenue, NW
Washington, DC 20460-0002

July 2003

BACKGROUND DOCUMENT FOR PROPOSED CPG V AND DRAFT RMAN V

CONTENTS

TABLES

I. INTRODUCTION

A. History

Section 6002(e) of RCRA requires EPA to designate items that are or can be made with recovered materials and to recommend practices to assist procuring agencies in meeting their obligations with respect to designated items under RCRA section 6002. After EPA designates an item, RCRA requires that each procuring agency, when purchasing a designated item, must purchase that item composed of the highest percentage of recovered materials practicable.

Executive Order 13101 (Executive Order) establishes the procedure for EPA to follow in implementing RCRA section 6002(e). Section 502 of the Executive Order directs EPA to issue a Comprehensive Procurement Guideline (CPG) that designates items that are or can be made with recovered materials. Concurrent with the CPG, EPA must publish its recommended procurement practices for purchasing designated items, including recovered materials content levels, in a related Recovered Materials Advisory Notice (RMAN). The Executive Order also directs EPA to update the CPG every 2 years and to issue RMANs periodically to reflect changing market conditions. The first CPG (CPG I) was published on May 1, 1995 (60 FR 21370). It established 8 product categories, designated 19 new items, and consolidated 5 earlier item designations. The first CPG update (CPG II) was published on November 13, 1997 (62 FR 60962) and designated an additional 12 products. The second CPG update (CPG III) was published on January 19, 2000 (65 FR 3070) and designated an additional 18 products. A third CPG update (CPG IV) designating an additional 7 items is due to be published shortly. Today, in CPG V, EPA is proposing to designate one new item—fertilizers made from recovered organic materials—and revise the designation for compost.

B. Contents of These Supporting Analyses

This document, hereafter referred to as the proposed CPG V/Draft RMAN V background document, explains EPA's overall objectives, the process for designating procurement items, and the methodology used in recommending recovered materials content levels for items designated and revised in the proposed CPG V. In addition, the proposed CPG V/Draft RMAN V background document lists the recommended procurement practices for designated and revised items.

Also for the reader's convenience, the table below lists acronyms referenced throughout this document.

Table 1
List of Acronyms

Acronym	Term
APP	Affirmative Procurement Program
ASTM	American Society of Testing and Materials
CAFO	Concentrated Animal Feeding Operations
C&D	Construction and Demolition
CIWMB	California Integrated Waste Management Board
CPG	Comprehensive Procurement Guidelines
DLA	Defense Logistics Agency
EPA	U.S. Environmental Protection Agency
GSA	General Services Administration
MSW	Municipal Solid Waste
NOP	National Organics Program
NPS	National Park Service
NRCS	National Resource Conservation Service
OFPP	Office of Federal Procurement Policy
OMRI	Organic Materials Review Institute
RCRA	Resource Conservation Recovery Act
RMAN	Recovered Materials Advisory Notice
STA	Seal of Testing Assurance
TMECC	Test Methods for the Examination of Composting and Compost
TNRCC	Texas Natural Resource Conservation Commission
TxDOT	Texas Department of Transportation

Acronym	Term
USCC	U.S. Composting Council
USDA	U.S. Department of Agriculture
U.S. DOT	U.S. Department of Transportation

II. BACKGROUND

A. Requirements

The Resource Conservation and Recovery Act (RCRA or the Act) section 6002 and Executive Order 13101 (Executive Order) specify requirements for the procurement of products containing recovered materials. The requirements of RCRA section 6002 apply to "procuring agencies," as defined in RCRA section 1004(17); the Executive Order applies only to federal "executive agencies," as defined in section 202 of the Executive Order.

Section 6002(e) of RCRA requires EPA to designate items that are or can be made with recovered materials and to recommend practices to assist procuring agencies in meeting their obligations with respect to the procurement of designated items under RCRA section 6002. After EPA designates an item, RCRA requires that each procuring agency, when purchasing a designated item, must purchase that item composed of the highest percentage of recovered materials practicable.

The Executive Order specifies the procedure for EPA to follow in implementing RCRA section 6002(e). Section 502 of the Executive Order directs EPA to designate items in the CPG and to recommend procurement practices for purchasing designated items, including recovered materials content levels, in a related RMAN. The Executive Order also directs EPA to update the CPG every 2 years and to issue RMANs periodically to reflect changing market conditions.

The following sections provide an overview of RCRA section 6002 and the Executive Order and explain the basis for designating specific products as procurement items subject to RCRA section 6002. Appendix I contains a summary of the generation and recovery of materials in the solid waste stream.

Appendix II provides a more detailed explanation of the provisions and requirements of RCRA section 6002. Appendix III provides additional details on the Executive Order. Appendix IV briefly discusses additional federal procurement policies and requirements, and Appendix V explains RCRA Section 6002 requirements for agencies to use in developing affirmative procurement programs.

1. RCRA Section 6002

RCRA section 6002 requires EPA to designate items that are or can be made with recovered materials and to recommend practices to assist procuring agencies in purchasing the designated items. Once an item is designated by EPA, procuring agencies that use appropriated federal funds to purchase the item are required to purchase it containing the highest percentage of recovered materials practicable (and in the case of paper, the highest percentage of postconsumer recovered materials), taking into consideration the limitations set forth in section 6002(c)(1)(A) through (C) (i.e., competition, price, availability, and performance). The requirement applies when the purchase price of the item exceeds $10,000 or when the total cost of such items, or of functionally equivalent items, purchased during the preceding fiscal year was $10,000 or more.

RCRA section 6002(d)(2) requires that, within 1 year after EPA designates an item, federal agencies revise their specifications to require the use of recovered materials to the maximum extent possible without jeopardizing the intended end use of the item. Section 6002(d)(1) further requires federal agencies responsible for drafting or reviewing specifications to review all of their product specifications to eliminate provisions prohibiting the use of recovered materials and requirements specifying the exclusive use of virgin materials. To comply with section 6002(d)(2), the revision process for items designated in CPG V should be completed within 1 year after the final CPG V is published in the *Federal Register*.

Once EPA designates an item, responsibility for complying with RCRA section 6002 rests with the procuring agencies. For each item designated by EPA, RCRA section 6002(i) requires each procuring agency to develop an affirmative procurement program (APP), which sets forth the agency's policies and procedures for implementing the requirements of RCRA section 6002. The APP must ensure that the agency purchases items composed of recovered materials to the maximum extent practicable and that these

purchases are made consistent with applicable provisions of federal procurement law. In accordance with RCRA section 6002(i), the APP must contain at least four elements:

1. A recovered materials preference program.

2. An agency promotion program.

3. A program for requiring vendors to estimate, certify, and reasonably verify the recovered materials content of their products.

4. A program to monitor and annually review the effectiveness of the APP.

Appendix V provides detailed information on APPs.

Finally, RCRA section 6002(g) requires the Office of Federal Procurement Policy (OFPP) to implement the requirements of RCRA section 6002 and to coordinate this policy with other federal procurement policies in order to maximize the use of recovered materials. RCRA further requires OFPP to report to Congress every 2 years on actions taken by federal agencies to implement such policy.

2. Executive Order 13101

Executive Order 13101, *Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition*, was signed by President Clinton on September 14, 1998. It replaces Executive Order 12873, *Federal Acquisition, Recycling, and Waste Prevention*. Section 502 of the Executive Order establishes a two-part process for EPA to use when developing and issuing the procurement guidelines for products containing recovered materials, as required by RCRA Section 6002(e). The first part of the process, issuing the CPG, involves designating items that are or can be made with recovered materials. The CPG is developed using formal notice-and-comment rulemaking procedures and is codified in the Code of Federal Regulations (CFR) at 40 CFR Part 247. The Executive Order requires EPA to update the CPG every 2 years.

The second part of the process is the publication of the RMAN, which provides recommendations to procuring agencies on purchasing the items designated in the CPG. The Executive Order directs EPA to

publish the RMAN in the FR for public comment. The RMAN, however, is not codified in the CFR, because the recommendations are guidance. RMANs are issued periodically to reflect changes in market conditions and provide procurement recommendations for newly designated items.

Appendix III provides additional information on the provisions and requirements of Executive Order 13101, including requirements for procuring agencies to comply with EPA's guidelines.

B. Criteria for Selecting Items for Designation

While not limiting consideration to these criteria, RCRA section 6002(e) requires EPA to consider the following when determining which items it will designate:

1. Availability of the item,
2. Potential impact on the solid waste stream of item procurement,
3. Economic and technological feasibility of producing the item, and
4. Other uses for the recovered materials used to produce the item.

EPA consulted with federal procurement and requirement officials to identify other criteria to consider when selecting items for designation. Based on these discussions, the Agency concluded that the limitations set forth in RCRA section 6002(c) should also be factored into its selection decisions. This provision requires each procuring agency to procure a designated item composed of the highest percentage of recovered materials practicable, while maintaining a satisfactory level of competition. A procuring agency, however, may decide not to procure an EPA-designated item containing recovered materials if it determines: (1) the item is not reasonably available within a reasonable period of time; (2) the item fails to meet the performance standards set forth in the agency's specification; or (3) the item is available only at an unreasonable price. EPA recognized that these limitations could restrict procuring agencies from purchasing EPA-designated items with recovered materials content, and, thereby, could limit the potential impact of an individual item designation. (The limitations of section 6002(c) also effectively describe the circumstances in which a designated item is "available" for purposes of the statute.) For this reason, EPA also takes into account the limitations cited in RCRA section 6002(c) in its selection of items for designation.

The Agency developed the following criteria for use in selecting items for designation: use of materials found in solid waste; economic and technological feasibility and performance; impact of government procurement; availability and competition; and other uses for recovered materials. The items proposed for designation or revision in CPG V have all been evaluated with respect to EPA's criteria. Details of these evaluations are discussed in Section V of this document.

1. Use of Materials Found in Solid Waste

All items designated in the CPG are manufactured with materials recovered or diverted from the solid waste stream. These include both materials recovered or diverted from municipal solid waste (MSW) and materials recovered or diverted from other solid waste streams, such as construction and demolition (C&D) debris, agricultural residue, and other nonhazardous waste streams. Once recovered or diverted, these materials are reclaimed and refined, disassembled and remanufactured, or separated and processed for use as feedstock to manufacture a new product. Appendix I provides an overview of the materials in MSW in the United States and provides a more detailed explanation of some of the materials used in the products proposed for designation in CPG V.

The potential impact that procuring agencies may have on the solid waste stream by procuring EPA-designated items varies depending on the sophistication of the process used to recover or refine the materials and on the recovered materials content of the final product. Additionally, although designating a single item may not have a significant impact on the amount of solid waste recovered or diverted from the waste stream, EPA has concluded that designating several items made from the same recovered material can lead to the diversion of substantial quantities of that material from the waste stream.

Information on the recovered materials used to produce items proposed for designation by EPA is presented in subsection 2(a), “Impact on Solid Waste,” within the individual item discussions in Section V.

2. Economic and Technological Feasibility and Performance

Before selecting an item for designation, EPA determines that, based on its market research, it is economically and technologically feasible to use recovered materials to produce the item. EPA uses several indicators in making this determination. The availability of the item in the marketplace and procurement of the item by federal and/or other procuring agencies are primary indicators that it is economically and technologically feasible to manufacture the product with recovered materials content. Other indicators include the ability of the item to meet performance specifications, the general acceptance of the item by consumers and purchasers, and the use of recovered feedstock by manufacturers.

RCRA directs EPA to "designate items that are or can be produced with recovered materials and whose procurement by procuring agencies will carry out the objectives of RCRA section 6002." This being the case, there may be instances where a particular item is not currently made with recovered materials content, but a similar item is. In those cases where the Agency has concluded that there are no technical reasons that prevent an item from being manufactured with recovered materials, and there is a demonstrated use of recovered materials in a similar item, EPA also may consider designation of the item that currently does not contain recovered materials.

Prior to selecting an item for designation, EPA also considers the ability of the item to meet the standards, specifications, or commercial item descriptions set forth by federal agencies or national standard-setting organizations.

Information on the economic and technological feasibility of producing items proposed for designation by EPA, including the availability of the item and the number of manufacturers that produce the item, the ability of the item to meet federal or national specifications, the recovered materials content levels used by manufacturers to produce the item, and other information relevant to the economic and technical feasibility of producing and using the item, is discussed in section 2(b), "Technological Feasibility and Performance," and section 2(d), "Economic Feasibility," in the individual item discussions in Section V of this document.

3. Impact of Government Procurement

The impact of government procurement of products containing recovered materials is a combination of: (1) direct purchases by federal agencies, (2) purchases made by state and local agencies using federal monies, and (3) purchases made by contractors to these government agencies. When considering items for designation, EPA examines whether government agencies and their contractors purchase the items.

Government procurement also has an impact that extends far beyond the federal, state, and local levels. As noted in RCRA and the Executive Order, the federal government often serves as a model for private and other public institutions. Because of this secondary effect, EPA includes items that are not unique to or primarily used by government agencies. Many of the items that EPA selects for designation are selected because they have broad application in both the government and private sectors.

Information on the impact of government procurement for each item proposed for designation in CPG V is presented in section 2(e), "Government Purchasing," in the individual item discussions in Section V of this document.

4. Availability and Competition

The items EPA selects for designation are available from national, regional, or local sources. The relative availability of an item influences the ability of a procuring agency to secure an adequate level of competition when procuring it. In the event that a satisfactory level of competition is unattainable, a procuring agency may elect to waive the requirement to purchase an EPA-designated item based on the limitations listed in RCRA section 6002(c).

Information on the availability of each item proposed for designation in CPG V including the number of manufacturers that produce the item, is presented in subsection 2(c), "Availability and Competition," in the individual item discussions in Section V of this document.

5. Other Uses for Recovered Materials

In selecting items for designation, EPA also considers the following: (1) the possibility of one recovered material displacing another recovered material as feedstock, thereby resulting in no net reduction in materials requiring disposal; (2) the diversion of recovered materials from one product to another, possibly creating shortages in feedstocks for one or both products; and (3) the ability of manufacturers to obtain recovered materials in sufficient quantity to produce the item under consideration.

While other uses for recovered materials are a consideration, they are not a determining factor when selecting items for designation, because there is a need for additional markets for all recovered materials used to manufacture the designated items.

6. Other Considerations

EPA also considers price as a factor affecting the availability of an item. The price of products, whether made from virgin raw materials or recovered materials, is affected by many variables, including the availability and costs of material feedstocks, energy costs, labor costs, rate of return on capital, transportation charges, and the quantity of the item ordered. In addition, price may vary depending on whether the product is a common stock item or whether it requires a special order. Price also can be affected by the geographical location of the purchaser, because some products are not uniformly available throughout the United States. The best sources of current price information, therefore, are the manufacturers and vendors of the recycled products.

Relative prices of recycled products compared to prices of comparable virgin products also vary. In many cases, recycled products may be less expensive than their virgin counterparts. In other cases, virgin products may have lower prices than recycled products. Other factors also affect the price of virgin products. For example, temporary fluctuations in the overall economy can create oversupplies of virgin products, leading to a decrease in prices for these items. Therefore, while price is a consideration, it is not in most cases, a determining factor when selecting items for designation. It becomes a determining factor only when EPA obtains evidence that the relative price of an item with recovered materials content

is significantly higher than the relative price of a comparable virgin product. For this reason, EPA did not address price in the individual item discussions in Section V of this document.

EPA has also considered the feasibility of designating experimental or developmental products containing recovered materials. In the Agency's experience, such designations do not result in federal procurement of products containing recovered materials, because the items are not reasonably available, or only one source exists, leading to an unsatisfactory level of competition. For this reason, EPA does not intend to designate experimental or developmental products until it can be shown that they meet all of EPA's selection criteria, as described above.

C. Methodology for Selecting Items for Designation

EPA used the following process to determine which items to designate in the CPG. First, EPA reviewed and updated information on items previously considered for designation but for which more information was needed.

Next, the Agency gathered information on new items from comments submitted in response to the initial CPG, which was proposed on April 20, 1994. On September 20, 1995, EPA published a FR notice requesting information from the public on potential items for inclusion in CPG. From December 1, 1995, through February 29, 1996, EPA accepted information from interested parties to consider when selecting items for designation, recommending recovered materials content levels for selected items, and revising recommendations for existing designated items.

In the September 20, 1995, notice, EPA requested information regarding the following seven areas:

1. Barriers to Purchasing Products Containing Recovered Materials:

    - What government specifications, standards, purchasing policies, or purchasing procedures preclude government agencies from purchasing the item containing recovered materials?

2. Use of Materials in Solid Waste:

   - Is the item made using a material that represents a significant portion of the solid waste stream or presents a solid waste disposal problem?

3. Economic and Technological Feasibility and Performance:

   - Does the item perform as well as necessary to meet a procuring agency's needs?
   - Are there government, American Society for Testing and Materials (ASTM), or other consensus standards or specifications that would enable a procuring agency to buy the item containing recovered materials?
   - Is the item available at a reasonable price considering normal market fluctuations?

4. Impact of Government Procurement:

   - Is the item purchased in appreciable quantities by the federal government or by state and local governments?

5. Availability and Competition:

   - Is the item available from an adequate number of sources to ensure competition?
   - Is the item generally available, rather than available in a limited market area?

6. Recovered Materials Content Levels:

   - What levels of recovered materials content are used in the product?
   - Is the recovered materials content postconsumer material? What percentage is postconsumer?

7. Sources of information:

   - What is the source of the information provided (e.g., industry studies, technical journals)?

Items proposed for CPG V designation are described in detail in Section V of this document. Those items that might be considered for designation at later date are presented in section VI.

D. Broad Categories Versus Specific Items

EPA has adopted two approaches in its designation of items that are made with recovered materials. For some items, such as paper products, the Agency designated *broad* categories of items and provided information in the RMAN as to their appropriate applications or uses. For other items, such as plastic envelopes, EPA designated *specific* items, and, in some instances, included in the designation the specific types of recovered materials or applications to which the designation applies. The Agency provided the following explanation for these approaches to designating items in the preamble to the first CPG (60 FR 21369, May 1, 1995):

> *EPA sometimes had information on the availability of a particular item made with a specific recovered material (e.g., plastic), but no information on the availability of the item made from a different recovered material or any indication that it is possible to make the item with a different recovered material. In these instances, EPA concluded that it was appropriate to include the specific material in the item designation in order to provide vital information to procuring agencies as they seek to fulfill their obligations to purchase designated items composed of the highest percentage of recovered materials practicable. This information enables the agencies to focus their efforts on products that are currently available for purchase, reducing their administrative burden. EPA also included information in the proposed CPG, as well as in the draft RMAN that accompanied the proposed CPG, that advised procuring agencies that EPA is not recommending the purchase of an item made from one particular material over a similar item made from another material. For example, EPA included the following statement in the preamble discussion for plastic desktop accessories (59 FR 18879, April 20, 1994): "This designation does not preclude a procuring agency from purchasing desktop accessories manufactured from another material, such as wood. It simply requires that a procuring agency, when purchasing plastic desktop accessories, purchase these accessories made with recovered materials..."*

The Agency understands that some procuring agencies may believe the designation of a broad category of items in the CPG requires them to: (1) procure all items included in such category with recovered materials content and (2) to establish an affirmative procurement program for the entire category of items, even where specific items within the category may not meet current performance standards. This is clearly not required under RCRA as implemented through the CPG and the RMAN. RCRA section 6002 does not require a procuring agency to purchase items with recovered materials content that are not available or that do not meet a procuring agency's specifications or reasonable performance standards for the contemplated use. Further, RCRA section 6002 does not require a procuring agency to purchase such items if the item with recovered materials content is only available at an unreasonable price or the purchase

of such item is inconsistent with maintaining a reasonable level of competition. However, EPA stresses that, when procuring any product for which a recovered materials alternative is available that meets the procuring agency's performance needs, if all other factors are equal, the procuring agency should seek to purchase the product made with highest percentage of recovered materials practicable.

III. ITEM DESIGNATION CATEGORIES

Items designated in the CPG are organized in the following product categories: paper and paper products, vehicular products, construction products, transportation products, park and recreation products, landscaping products, nonpaper office products, and miscellaneous products. The categories were developed to describe the application of each designated item.

- **Paper and Paper Products.** Includes printing and writing papers, newsprint, tissue products, paperboard products, and packaging. This category does not include paper and paper products used in construction applications. A final RMAN for paper and paper products containing recovered materials was issued on May 29, 1996, at 61 FR 26985, and an updated RMAN (Paper Products RMAN II) was issued on June 8, 1998, at 63 FR 31214. No paper products are included in CPG V.

- **Vehicular Products.** Products used in repairing and maintaining automobiles, trucks, and other vehicles. Examples include re-refined lubricating oils, retread tires, and engine coolants. No vehicular products are included in CPG V.

- **Construction Products.** Products used in constructing roads and the interior and exterior components of commercial and residential buildings. Examples include building materials and paint. No construction products are included in CPG V.

- **Transportation Products.** Products used for directing traffic, alerting drivers, and containing roadway noise and pollution. Examples include parking stops and traffic control devices. No transportation products are proposed for designation in CPG V.

- **Park and Recreation Products.** Products used in operating and maintaining parks and recreational areas. Examples include playground equipment and running tracks. No park and recreation products are proposed for designation in CPG V.

- **Landscaping Products.** Products used to contain, maintain, or enhance decorative and protective vegetation or areas surrounding buildings and roadways. Examples include compost and hydraulic mulch. In CPG V, EPA is proposing to designate fertilizers containing recovered organic materials and revise the designation of compost by adding compost containing manure or biosolids to the existing designation.

- **Nonpaper Office Products.** Equipment and accessories used by government agencies and businesses to perform daily operational and administrative functions of an office. Examples include toner cartridges, desktop accessories, and waste receptacles. No nonpaper office products are included in CPG V.

- **Miscellaneous Products.** Includes all other products not covered by the categories listed above. No miscellaneous products are included in CPG V.

IV. DEFINITIONS

The proposed item designations and the purchasing recommendations in the draft RMAN V use the term "recovered materials." The definition for this term is shown below for the convenience of the reader. This definition was included as part of the original CPG and can also be found at 40 CFR§247.3.

> **Recovered materials** means waste materials and byproducts which have been recovered or diverted from solid waste, but such term does not include those materials and byproducts generated from, and commonly reused within an original manufacturing process.

I. LANDSCAPING PRODUCTS

A. Compost Made From Manure or Biosolids

1. Item Description

EPA conducted research on the use of compost made from manure or biosolids in the United States. EPA previously designated yard trimmings compost and food waste compost as part of the CPG.

Composting is the controlled biological process of decomposition of organic matter in the presence of air to form a humus-rich material which provides organic matter and nutrients to the soil. Mature compost (in which the composting process is completed) is composed of small brown particles, resembles soil, and is free of pathogens and weed seeds. The U.S. Composting Council (USCC) defines mature compost as follows:

> *Compost is the stabilized and sanitized product of composting; compost is largely decomposed material and is in the process of humification (curing). Compost has little*

resemblance in physical form to the original material from which it was made. Compost is a soil amendment, to improve soils. Compost is not a complete fertilizer unless amended, although composts contain fertilizer properties, e.g., nitrogen, phosphorus, and potassium, that must be included in calculations for fertilizer application (59 [Federal Register] FR 18877).

Mixed organic materials, such as manure, yard trimmings, food waste, and biosolids (waste-water treatment plant sludge), must go through a controlled heat process before they can be used as high quality, biologically stable and mature compost (otherwise it is considered mulch, manure, or byproduct). Compost has a variety of uses and improves soil quality and productivity as well as preventing and controlling erosion.

Animal manures, applied in solid, semisolid, and liquid forms, have traditionally been used as a direct source of nutrients for crop production, although it is typically not characterized as a fertilizer (for the purposes of the CPG, organic fertilizers were considered as a separate item).

Compost can be used in a wide range of applications. It can be used as a substitute for peat moss, potting soil, topsoil, or other organic materials in agriculture, horticulture, silviculture (growing of trees), and in landscaping. In landscaping, compost is used as a soil conditioner, soil and lawn amendment, potting soil mixture, rooting medium, and mulch for shrubs and trees, and for restoration and maintenance of golf course and other sports grounds. Compost also can be used for treatment of contaminated soils, contaminated stormwater runoff, volatile organic compound emission reduction, and reclamation of mining sites.

2. Rationale for Designation

EPA has concluded that composts made from recovered organic materials meet the statutory criteria for designation. A final designation would require that a procuring agency, when purchasing compost, purchase compost containing recovered organic materials, such as yard trimmings, food waste, animal manure, and biosolids, when the compost meets applicable specifications and performance requirements.

a. Impact on Solid Waste

Using manure compost has great potential to make beneficial use of a large amount of the manure produced in the United States. In addition, other materials that are used as bulking agents in manure compost, such as sawdust, extruded rice husks, straw, leaves, wood chips, corn stalks, and ground tree and shrub trimmings, can be diverted from the solid waste stream as well.

Generally, manure generated on farms is applied directly to crop fields as a soil supplement. Larger livestock farms give the manure away or sell it directly to neighboring farms for agricultural application, and sometimes store excess manure on location. Some larger farms pay for manure removal, which is then sold through a broker to a third party.

In the United States, beef cattle generate 27 million tons of manure solids annually and dairy cattle in confinement produce approximately 21 million tons of solids annually. Swine produce about 16 million tons of solid waste annually. In 1990 there were approximately 330 million acres of cropland and 650 million acres of pasture and rangeland in the United States, providing abundant space for application of animal manures.

EPA estimates that the 16,000 public owned treatment works in the United States generate approximately 7 million tons of sewage sludge annually. Until 1992, millions of tons of biosolids were dumped into the Atlantic Ocean. This practice, however, was made illegal as a result of public concern over ocean pollution. About 60 percent of all sewage sludge is treated to generate biosolids that are beneficially used as a fertilizer on farmland. Of the remainder, 17 percent ends up buried in a landfill; 20 percent is incinerated; and about 3 percent is used as landfill or mine reclamation cover.

b. Technological Feasibility and Performance

Compost can be used in a variety of applications including:

- Soil enrichment: agriculture (soil conditioning, fertilizer amendment, erosion control, development of marginal lands, mulch, rooting medium, sod production); silviculture; horticulture.

- Pollution prevention (reduced chemical use and nonpoint source pollution, reduced VOC emissions).
- Pollution remediation (treatment of contaminated soils and reclamation of mining waste).

Composting converts nutrients into forms that are more stable and less reactive, do not leach, make nutrients more available to plants, and kill weed seeds and pathogens. EPA has concluded that composting can reduce nutrient loading and nonpoint source pollution of streams and rivers.

Microorganisms use many of the nutrients in compost and release them slowly as they die. Nutrients are also converted into forms that bind with humic acids (another byproduct of composting). These acids hold 3-5 times more nutrients than inorganic soil, holding the nutrients at the surface near the roots. This helps increase availability and prevents leaching. Composting reduces the carbon-to-nitrogen ratio in manure, which can prevent the immobilization of nitrogen by microorganisms, a problem that can occur when using raw manure.

Beneficial organisms stimulated by the use of compost fall into three categories: macroorganisms (bugs, worms, etc.), bacteria, and fungi.

Macroorganisms aid composting through their ability to breakdown materials into small pieces. This creates a larger surface area on which bacteria and fungi can feed. In addition, some macroorganisms are predatory and may feed on harmful organisms.

Bacteria microbes degrade organic matter into forms more available to plants. Many can also fix atmospheric nitrogen and convert it into forms that plants can use, which helps decrease the amount of synthetic fertilizers that must be applied. Recent research has also shown that the bacteria in compost are effective in suppressing some plant diseases. They do this by competing for resources, by secreting antibiotics, and by elevating the plant's own resistance capabilities.

Fungi are essential for the breakdown of organic matter and in compost, fungi are responsible for creating humic acids. Fungi help roots uptake water and nutrients and are essential to plant growth and health. Fungi also free up nitrogen and carbon for use by plants. Finally, some fungi secrete antibiotic

compounds that can kill disease-causing bacteria, and some kill and consume larger pests such as nematodes.

Compost has nearly the same characteristics as peat and can be used as a substitute, reducing the impact to wetlands where peat is extracted. Compost may become a feasible alternative to peat as federal protection of wetlands increases.

Using compost may have some climate-related benefits as well. When analyzing the composting of yard trimmings, EPA found that compost leads to long-term carbon storage in degraded soils. The agency also found that composting, when managed properly, does not generate methane emissions. Properly managed compost is aerated and turned to ensure aerobic decomposition (i.e., decomposition in the presence of oxygen). As long as the yard trimmings decompose aerobically, methane is not generated. EPA also noted that carbon dioxide emissions during decomposition "do not count" towards national inventories of greenhouse gas emissions submitted annually to the United Nations Framework Convention on Climate Change. According to internationally accepted rules, these emissions are considered part of the natural carbon cycle and are not a reflection of human activities. On the other hand, EPA found that composting does result in minimal carbon dioxide emissions during the collection and transport of yard trimmings to the composting facility.

By reducing the amount of chemical fertilizers required, net greenhouse gas emissions are reduced because there is less energy-intensive fertilizer production.

Use of compost helps reduce reliance on synthetic chemical fertilizers, and thus reduces the amount of chemicals entering the environment. Under USDA's National Organic Program (NOP), organic farms, which by definition do not use synthetic pesticides, herbicides, or fertilizers, may not use biosolid-based compost, such as waste-water treatment sludge, if they wish to keep their organic certification. This means a greater demand for manure-based compost. One requirement of certified organic farming is the use of natural fertilizers and compost. Although a commercial compost operation may become USDA certified, it is not required to do so, and a certified organic farm is not required to use certified organic compost. However any compost used by an organic farm must meet the requirements of USDA's NOP regulations, section 205.203. These regulations require that raw manure be composted unless it is applied to land used

for a non-food crop or unless a food crop is harvested after a reasonable period of time from the last application of manure. According to a contact at OMRI, compost made from manure from livestock that have been treated with hormones or antibiotics is still considered acceptable for use on an organic farm.

Manure found in compost is a source of many nutrients, including nitrogen, phosphorus, potassium, and others. Nutrient content and rate of availability varies widely, depending mostly on manure source, handling methods, and water content. However, nitrogen is often the main nutrient of concern for most crops. Generally, poultry manure is highest in nitrogen content, followed by hog, steer, sheep, dairy, and horse manure. Feedlot steer manure must be applied at fairly high rates to provide adequate first-year nitrogen amounts because of its lower nitrogen content and gradual nitrogen release characteristics. However, this leads to higher nitrogen availability in succeeding years, allowing for lower annual application rates to support plant growth.

Table 2. Manure Nutrients. (Typical)

	Nitrogen (N)	**Phosphorus (P_2O_5)**	**Potassium (K_2O)**	**Calcium (Ca)**	**Magnesium (Mg)**	**Organic matter**	**Moisture content**
Fresh Manure	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Cattle	0.5	0.3	0.5	0.3	0.1	16.7	81.3
Sheep	0.9	0.5	0.8	0.2	0.3	30.7	64.8
Poultry	0.9	0.5	0.8	0.4	02	30.7	64.8
Horse	0.5	0.3	0.6	0.3	0.12	7.0	68.8
Swine	0.6	0.5	0.4	0.2	0.03	15.5	77.6
Treated Dried Manure	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Cattle	2.0	1.5	2.2	2.9	0.7	69.9	7.9
Sheep	1.9	1.4	2.9	3.3	0.8	53.9	11.4
Poultry	4.5	2.7	1.4	2.9	0.6	58.6	9.2

If improperly managed, the manure generated by beef feedlot and dairy operations can create significant environmental problems, including human health issues caused by contamination of surface water and groundwater. Using manure as a raw material for compost, as opposed to applying it directly to

the land or stockpiling it, can alleviate many of these problems, while providing an important agricultural service.

Regarding a connection between *E. coli* and manure, a representative of the California Certified Organic Farmers states "While not all manures carry *E. coli*, manure is a documented source of *E. coli* contamination and should thus be handled cautiously in a fresh produce production system. Well-composted manures are recommended over the use of raw manures." The Organic Trade Association adds that *E. coli* , *salmonella*, and other pathogens found in manure can be reduced by proper composting.

EPA's research found several references indicating that compost, particularly manure compost, may contain high salt levels. The California Integrated Waste Management Board's (CIWMB's) compost specification elements table states that high salt concentrations (greater than 4.0 Mmhos/cm) can be harmful to plants and seeds. In addition, salinity issues are mentioned in several of CIMWB's organics management fact sheets. One on compost use in orchards states, "Feedstock that contains large amounts of salt, such as animal manure, can result in compost that can be problematic for orchards in which the soil already has a high salt content. However, if the soil in a particular orchard does not have a history of high salt content, salt from compost or mulch should not generally present a problem for Northern California orchards." Another fact sheet on urban compost states "Too much salinity will be detrimental to plant growth. Maximum tolerable salinity level will depend on plant species, irrigation water and soil salinity, amount of leaching due to rain and irrigation, and compost application rate." A Colorado State University Web site states that salt levels will be higher in composted manure than in raw manure.

Composting can reduce the volume of raw manure by as much two-thirds, and it can be applied year-round. It also reduces the moisture content and alters consistency to a more spreadable form. These effects can improve manure handling and decrease spreading cost.

Table 3. Composition of Compost vs. Raw Manure

	Fresh Manure	**Compost**
Total	1000 kg	1000 kg
Water	700 kg	300 kg
Dry Matter	300 kg	700 kg
Nitrogen	5 kg (based on 1.7% N)	11 kg (based on 1.6% N)
Phosphorus	1 kg (based on 0.33% P)	4 kg (based on 0.58% P)

Regulations, Standards, and Guidelines

There are a variety of reference materials and guidelines available on manure compost but no existing national or state regulations or laws regarding manure compost in particular. Most states have their own regulations governing composting facilities and the marketing of compost products. According to a contact with Biocycle magazine, the National Resource Conservation Service (NRCS) within USDA is currently developing draft guidelines for manure compost.

The USCC is helping to define and develop industrywide standards for composts made from various combinations of materials. The USCC has developed protocols, called Test Methods for the Examination of Composting and Compost (TMECC), which are standardized methods for the composting industry to test and evaluate compost and verify the physical, chemical, and biological characteristics of composting source materials and compost products. The TMECC also includes material testing guidelines to ensure product safety and market claims. The TMECC guidelines form the basis for a grant from the EPA to the USCC to develop a Seal of Testing Assurance (STA) for the commercial composting industry. The STA program includes standards for testing procedures of composted materials for nutrients, moisture, salt content, and chemicals. The USCC's goal is to get all composters to participate in the program and to have compost purchasers, regulators, and users accept only STA-certified compost for their projects. Finally, the USCC’s Uniform Bills committee has been given a directive to develop a draft "Model Compost Law", which it is still working on.

The U.S. Department of Transportation's (U.S. DOT) *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects 1996* specifies mature compost for use in road construction. This specification would be applicable to use of manure compost.

On December 16, 2002, EPA and USDA finalized a rule that will require all large Concentrated Animal Feeding Operations (CAFOs) to obtain permits, submit annual reports, and develop and follow plans for handling manure and wastewater. This rule should encourage feeding operations to compost their manure as an agricultural or landscaping product. This will not only benefit the environment, but more of this compost will be available to government purchasers.

In general, on-farm manure composting comes under minimal regulations, which may include requirements to notify the proper authorities of compositing activities. EPA; some state agencies, such as the Washington State Department of Ecology; and some local agencies have established guidelines concerning compost production. For example, for a region in the State of Washington, the final authority on manure compost rests with the Whatcom County Department of Health and Human Services, which has established rules based on a tiered system of feedstock qualities. USDA, pursuant to the recently passed Farm Bill, will be issuing guidelines on biobased products, which would include composts made from plant or animal byproducts.

On February 19, 1993, *The Standards for the Use of Disposal of Sewage Sludge* (Title 40 of the Code of Federal Regulations [CFR], Part 503) was published in the Federal Register (58 FR 9248 to 9404) and became effective on March 22, 1993. This regulation is commonly referred to as 'Part 503,' and was designed to protect public health and the environment from any potentially adverse effects from pollutants that might be contained in biosolids. Part 503 establishes rules for the final use or disposal of biosolids when they are:

- Applied to land to condition the soil or fertilize crops or other vegetation grown in the soil.
- Placed on a surface disposal site for final disposal.
- Fired in a biosolids incinerator.

Part 503 designates different classifications of biosolids, and are as follows:

- Class A biosolids: These biosolids are grouped into two different categories: "Exceptional Quality," and "Non-Exceptional Quality," depending on the method of disinfection used. Class A biosolids are far superior (2000 times more stringent disinfection) than Class B biosolids (N-Viro, 1999). To be classified as Class A, a biosolid must have levels of pathogens that are undetectable.

- Class B biosolids: All Class B biosolids are Non-Exceptional Quality. Biosolids are classified as Class B if they contain detectable levels of pathogens.

It is important to note that, in addition to Part 503, individual state regulations also apply to the use of and disposal of biosolids. Many states impose even more stringent regulations on biosolids. As a result, it is important to be aware of the individual state guidelines on the use of and disposal of biosolids.

c. Availability and Competition

EPA was not able to find an estimate of the total number of composting facilities nationwide, but according to EPA's "Municipal Solid Waste in The United States: 2000 Fact and Figures" (EPA530-R-02-001) there were an estimated 3,800 composting facilities for yard trimmings in 2000.

EPA did learn, however, that manure and manure compost are widely available across the country from small farms, industrial size-feedlots, commercial compost producers, and other businesses. The market for compost manure is locally based. For example, Texas Best Compost near Austin provides manure compost for landscape projects, nurseries, large and small farms, and for private use. The company sells to colleges, schools, the Texas Department of Transportation and other public agencies. Magic Valley Compost in Idaho sells 75 percent of its compost manure at 3 tons per acre to small local farms, landscapers, school districts, and golf courses. The company sells more than 65,000 tons a year. The market has been expanding and the company has experienced 95-97 percent rate for repeat customers.

According to a 1998 survey conducted by *BioCycle, The Journal of Composting and Recycling*, 274 biosolids composting facilities were in operation in the United States. Nearly 50 more facilities were in various stages of planning, design, and construction (EPA, OWM, MTB, 2000).

d. Economic Feasibility

There are numerous potential markets for manure compost, including:

- Agriculture: Soil conditioning, fertilizer amendments, and erosion control for vegetable and field crops and forage grasses; development of marginal lands; mulching after conservation seeding.
- Silviculture: Landspreading as soil conditioner for evergreen establishment; mulching for woodlot soil improvement and maintenance.
- Sod production: Blending with topsoil to reduce the amount of fertilizer needed to establish sod.
- Residential retail: Soil amendment to enrich planting areas; top dressing for lawns.
- Nurseries: Potting mixes; topsoil amendment for areas in which field grown trees are harvested on a periodic basis.
- Delivered topsoil: Blending with marginal topsoils to produce topsoils used for establishing new lawns and planting trees and shrubs.
- Landscapers: Soil amendment for lawn establishment; top dressing; mulch.
- Landfill cover and surface mine reclamation: Topsoil amendments for lower grade and nonuniform compost products.

Manure compost provides a number of economic advantages. If raw manure has to be transported a significant distance, however, transportation costs can easily exceed the value of the manure. According to one contact, manure compost is lighter than raw manure due to a lower moisture content and is easier to

transport. It also keeps longer than raw manure due to its makeup, which allows for longer transportation time.

Manure compost can also greatly offset the use and costs of fertilizers. For example, an Oregon farm estimates that the use of chemical fertilizers will be reduced by as much as 40 percent by using composted dairy manure on crops.

Organic farming and the horticulture industry are growing markets with opportunities for manure compost. Furthermore, EPA wetland regulations may reduce the availability of peat, driving up its price. Therefore, it is likely that compost will become a more economical alternative to peat.

According to Resource Recycling Systems, Inc., sludge derived products, such as biosolids compost, are less expensive to produce than chemical fertilizers, while still containing comparable nutrient content (RSSI, 2003). An example of the cost for biosolids compost is $18.95 per cubic yard (TOP, 2003).

e. Government Purchasing

To assist in the development of federal markets for compost, a Presidential memorandum entitled "Environmentally and Economically Beneficial Practices on Federal Landscaped Ground" was signed on April 26, 1994. Agencies are encouraged to develop practical and cost-effective landscaping methods that preserve and enhance the local environment. This memorandum requires the use of mulch and compost by federal agencies and in federally funded projects.

The Texas Natural Resource Conservation Commission (TNRCC) is working with the Texas Department of Transportation (TxDOT) to use large amounts of manure compost along designated TxDOT highway land. During the past 18 months, compost operators have seen their sales increase significantly statewide to more than 250,000 cubic yards. TxDOT is expected to be the largest governmental purchaser of compost, some of which includes manure, over the next few years. TxDOT has

already used more than 170,000 cubic yards of manure across the state. This use is expected to increase dramatically as projects progress. TxDOT has also identified projects among its participating districts that will use in excess of 160,000 cubic yards—more than half of its commitment for the 3-year project. TxDOT has been using compost for both construction and maintenance activities. It will soon be expanding use of compost for filter berms, which are placed across water channels to filter the water.

TxDOT has developed new specifications and revised others to increase compost use among its districts. These cover proper application and use of compost for controlling erosion and sedimentation, and for establishing vegetation on roadsides after construction and maintenance activities. The State of Texas also offers public agencies incentives for purchasing compost manure. For example, the Texas Commission on Environmental Quality approached TxDOT to purchase more compost in order to help alleviate manure problems and associated water quality issues in certain regions of Texas. TxDOT is taking part in an EPA buy-back program, in which EPA pays TxDOT $5 per cubic yard of compost that TxDOT purchases from this region.

The Idaho Department Of Transportation is also purchasing manure compost for use in new road construction and reclamation. One compost company conducts 25 percent of their business with the Idaho Department Of Transportation, which purchased approximately 30,000 tons in the last 4 years. The average size of the projects is 4 to 5 thousand tons.

Government agencies typically use compost and fertilizers for numerous applications, such as landscaping, agriculture, bioremediation, roadside maintenance, and erosion control. Although EPA does not know the exact amounts of these materials used by agencies, we believe it is significant, and that manure compost could be used in many of these applications.

There are many municipalities around the country that use biosolids compost for a variety of applications. King County, Washington, has a contract with a local biosolids compost manufacturer, GroCo, Inc., and uses the product for various applications, including landscaping projects at local schools and rehabilitating logging roads through enhanced growth of native vegetation (King County, 2002). A

biosolids compost product called ComPro, produced in Silver Spring, Maryland, is marketed and sold around the District of Columbia metropolitan region. ComPro has been used on the lawns at the White House, Mount Vernon, The Maryland Governors Mansion, and the National Arboretum (Metropolitan Council, 2003).

f. Barriers to Purchasing

Several efforts and initiatives should reduce any barriers to purchasing manure compost. For example, the USCC's TMECC, which include material testing guidelines to ensure product safety and market claims, and STA, which includes standards for testing procedures, will bring consistency to the industry and ensure quality assurance/quality control. In addition, agencies will be encouraged and find it easier to purchase manure compost as a result of USDA's impending biobased product guidelines, required in the recently passed Farm Bill. Executive Order 13101 also encourages the purchase of biobased products.

Although using manure compost for certain applications may involve higher initial costs, EPA believes over the long term, manure compost will be cost-effective.

Potting soil, top soil, and peat moss have long established markets that could make it difficult for manure compost to increase in overall market share.

State-by-state regulations on the use and disposal of biosolids can differ greatly, and can complicate the procurement of biosolids compost. In addition, biosolids compost has become so popular in many regions that, in some cases, the demand greatly exceeds the supply. This is the case for ComPro in the District of Columbia metropolitan region.

g. Designation

EPA proposes to revise the current compost designation to include compost made from manure or biosolids as an item whose procurement will carry out the objectives of section 6002 of RCRA. Furthermore, in order to simplify the designation of compost and make it easier for procuring agencies to track and report their purchases of compost, the Agency is also proposing to amend the previous designations of yard trimmings compost and food waste compost and consolidate them with the designation of compost made from manure or biosolids into one item called "compost made from recovered organic materials." EPA believes that these four organic materials (i.e., yard waste, food waste, manure, and biosolids) are the most commonly used in commercially available compost. EPA is also aware that other organic materials could be used in compost, but these are generally mixed with one or more of the aforementioned materials. For this reason, EPA is proposing to use the general term "organic materials" in its compost designation, rather than limit the designation to specific types of organic materials.

3. Procurement Recommendations

a. Recovered Materials Content

Manure compost is composed of 10-100 percent manure taken from farms, racetracks, feedlots, dairy barns, poultry houses, and swine operations. This range may include manure and other excrement contained in animal bedding, which is typically added as a bulking agent in the compost process. Bulking agents, which comprise the non-manure portion of the compost, provide structure, allow air to circulate more freely, and increase carbon content of the compost.

For the most part, all composted biosolids contain 100 percent recovered materials. The base for all biosolids compost is dried sewage sludge—or "sludge cake"—which has gone through a wastewater treatment process to remove water and destroy a majority of disease-causing pathogens. This sludge is then mixed with a bulking agent for composting. Examples of bulking agents used include: wood chips, chipped yard waste, wood ash, sawdust, rice hulls, and recycled compost.

b. Preference Program

EPA recommends that procuring agencies purchase or use mature compost made from recovered organic materials in such applications as landscaping, seeding of grass or other plants on roadsides and embankments, as nutritious mulch under trees and shrubs, and in erosion control and soil reclamation.

EPA further recommends that those procuring agencies that have an adequate volume of organic materials, as well as sufficient space for composting, should implement a composting system to produce compost from these materials to meet their landscaping and other needs.

c. Specifications

EPA recommends that procuring agencies refer to the U.S. Composting Council's Test Methods for the Examination of Composting and Compost (TMECC) at <www.compostingcouncil.org>, which are standardized methods for the composting industry to test and evaluate compost and verify the physical, chemical, and biological characteristics of composting source materials and compost products. The TMECC also includes material testing guidelines to ensure product safety and market claims. Procuring agencies should also check for individual state regulations on the use of compost.

The U.S. Department of Transportation's "Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects 1996," specifies compost as one of the materials suitable for use in roadside revegetation projects associated with road construction.

EPA issued regulations in 1993 that limit the pollutants and pathogens in biosolids, entitled "The Standards for the Use or Disposal of Sewage Sludge," otherwise known as "the Part 503 Biosolids Rule." (40 CFR Part 503) If biosolids are included as part of the compost, the processing and product are subject to the Part 503 Biosolids Rule. Furthermore, if the finished compost product meets 40 CFR Part 503 Biosolids Rule Class A specifications for the highest level of pathogen and vector control (as described in

Section 2.3.1 of Part 503) and specific metals limits, the compost product can be widely used, like any other fertilizer or soil-conditioning product.

Finally, EPA recommends that procuring agencies ensure that there is no language in their specifications relating to landscaping, soil amendments, erosion control, or soil reclamation that would preclude or discourage the use of compost made from recovered organic materials.

B. FERTILIZERS MADE FROM RECOVERED ORGANIC MATERIALS

1. Item Description

EPA conducted research on organic fertilizer use in the United States. Although compost has some fertilizer qualities, for the purposes of the CPG, compost is considered a separate category and is not included in this discussion of organic fertilizers.

USDA defines a fertilizer as "a single or blended substance containing one or more recognized plant nutrient(s) which is used primarily for its plant nutrient content and which is designed for use or claimed to have value in promoting plant growth".

All plants and crops require nutrients (both macro and micro) to fully develop. While some of the required macronutrients, such as oxygen and hydrogen, are readily available from the atmosphere, many of the other necessary nutrients that are found in the soil, such as nitrogen, phosphorus, and potassium can often be in very short supply. In addition, once a crop is harvested, many of the nutrients that it relies on for healthy development and full maturation are permanently removed with it from the soil. In order to compensate for this limited supply of vital nutrients and to provide the plant with the necessary environment to fully mature, fertilizers are often added to the soil. The most essential nutrients—nitrogen, phosphorus, and potassium—are often expressed as the N-P-K ratio following the name of a fertilizer (e.g., 10-10-10).

Many sources of organic matter are available for the production of organic fertilizers, including plant and animal by-products, manure-based/biosolid products, and rock and mineral powders. Only some of these are recovered materials, however.

Organic fertilizers can be used to replace traditional chemical fertilizers in various applications, such as agriculture and crop production, landscaping, horticulture, parks and other recreational facilities, on school campuses, and for golf course and turf maintenance.

The following is a list of the more commonly utilized sources of organic matter that are used to produce organic fertilizers:

Plant By-Products

Alfalfa meal:	Contains around three percent nitrogen and is commonly used as animal feed. It is an excellent fertilizer material for horticultural applications due to the fact that it contains the hormone, Triacontanol, a plant growth regulator which makes its mineral content more effective as plant nutrients.
Cottonseed meal:	A by-product of cottonseed oil manufacturing, it is a rich source of nitrogen (around 7 percent). It is often sold in the form of meal, cake, flakes, or pellets.
Fruit pomaces:	These are what remain after the juice is squeezed from the fruit. They are normally heavy, wet products and are more effective when composted before use.
Soybean meal:	Contains about 7 percent nitrogen and is similar to alfalfa in that it is most commonly used as a protein supplement for animal feed. Soybean meal can be a very effective organic fertilizer, however is usually quite expensive.
Wood ash:	Wood ash is the residue that remains after the combustion of wood or unbleached wood fiber. It has the potential to be used as a lime substitute.
Seaweed:	Usually is made of kelp that has been harvested, dried, and ground. However it may also be available in soluble solutions for foliar spray applications. Seaweed

has been found to contain beneficial biostimulants that stimulate growth and increase yields of a wide variety of crops. For the most part, none of the micronutrients found in seaweed extracts is present in a sufficient quantity to solely correct deficiencies found in most soils, however seaweed extracts applied as "tonics" have been accepted by many in the organic agricultural community due to their broad array of micronutrients.

Animal By-Products

Blood meal: Blood collected from slaughterhouse operations, which has been dried and made into a powder. It contains about 12 percent nitrogen. Once collected, blood is placed in on-site cooling tanks that utilize agitation to prevent coagulation of the fresh blood. The blood is then delivered to drying plants where it is centrifuged to remove foreign material. It is then spray dried at low temperatures and pulverized into a powder.

Bone meal: Produced from animal bones that have been discarded during the processing of meat. It is a very rich source of phosphorus, typically containing around 12 percent. Bone meal is available in several different forms: fresh bone meal (green bone meal), bone meal (raw bone meal), steamed bone meal, and bone meal ash.

Feather meal: A common by-product of the poultry slaughter industry. Feather meal usually contains between 7 and 10 percent nitrogen. The nature of feathers is such that they tend to break down and release their nitrogen much more slowly than other fertilizers of the same price. Feather meal is produced by cooking feathers in a pressurized chamber. The resulting meal is then dried and ground into a powdered end product.

Fish meal: The clean, dried ground tissue of undercooked whole fish or fish cuttings, it contains roughly 10 percent nitrogen and about 6 percent phosphorus. It is most commonly used as an additive for animal feed, but can also be used as a fertilizer. Fish meal is produced by cooking raw fish material to break down some of the protein. The resulting slurry is then dehydrated through a steam heating process.

Fish emulsion: Nutrient contents usually vary, depending on the preparation method, but the nitrogen content is typically 4 percent regardless. Fish emulsion is sometimes fortified with chemical fertilizers. This is usually the case when nitrogen content is above 5 percent.

Leather meal: Ground tannery waste, it usually contains 10 percent nitrogen. Leather meal is prohibited in organic agriculture because it often contains about 3 percent added chromium.

Manure-Based/Biosolid Products

Poultry manure/litter: Usually contains between 2 and 5 percent of each of the vital nutrients. Most manure/litter fertilizers are available in a pelletized form (see below).

Sewage sludge: Typically available in two forms: activated (6-3-0) and composted (1-2-0). Sewage sludge provides soil with organic matter and a number of nutrients. It is often marketed in a solid form with little odor.

Rock and Mineral Powders

When considering the use of natural materials like rock, it is important to realize that there is very little consistency from one batch to another. What applies in one region might not be pertinent in another region.

Granite dust: Granite is mostly feldspar, a mineral that is high in potassium but has a very low solubility. This is due to the fact that feldspar is very tightly bound in its mineral structure.

Glauconite: Commonly sold as green sand, it is another source of “slowly available” potassium. Green sand is said to have desirable effects on soil structure, however its high price usually limits its use to high-value horticultural applications.

Biotite (black mica) Contains several percent potassium, which, due to its structure (unlike that of feldspar and greensand), is relatively available in microbially active environments. When pure biotite can be procured at a reasonable price, it can be cost-effective and useful.

Organic fertilizers are available in many forms, including: liquid solutions, granular powders, and solid pellets. However, most organic fertilizers that are manure-based, namely poultry fertilizer, are available in pellet form. The process by which manure-based organic fertilizing pellets are produced

(known as pelletization) is as follows: 1) excess litter is collected from farms; 2) litter is transported to fertilizer pellet production facilities; 3) litter is heat-pasteurized to destroy harmful bacteria; 4) dried litter is passed through a hammer mill where it is reduced to the consistency of sand; 5) granulated litter is transported to a pellet mill where the litter is formed into small pellets; 6) Pellets are cooled to ambient air temperature to ensure product quality.

Sewage sludge is mostly marketed in a pelletized form. There are plants in several cities across the country that produce sludge pellets. Sludge pellets can be made in a variety of ways. The following is one of the more typical methods that is employed:

Raw sewage is separated into wastewater and solids. The wastewater is chemically disinfected with chlorine and then discharged. The solid material (raw sludge) is placed into digesters where microbes decompose the organic solids and destroy most of the disease-causing pathogens. This sludge, which can contain up to 97 percent water, is then mixed with a coagulating agent and pressed with wide fabric belts. This acts to remove water and compress the sludge into sheets. The resulting solid (referred to as sludge cake) is then baked in a "tumble-drying" oven that destroys all pathogens and bacteria, removes up to 90 percent of the remaining water, and rotates the sludge into the final product.

2. Rationale for Designation

EPA has concluded that fertilizers made from recovered organic materials meet the statutory criteria for selecting items for designation.

a. Impact on Solid Waste

The use of organic fertilizers can help reduce the amount of agricultural by-products, manufacturing and processing waste, and other materials that would otherwise have to be disposed, stockpiled, or treated. Organic materials may be combined with other waste materials, such as saw dust or wood shavings, as is the case with poultry fertilizer. The amount of these wastes diverted from the waste stream varies depending on the materials used and the size of the farm or agricultural activity that supplies the materials.

Poultry litter, in particular, presents a great opportunity for diversion of waste material. Poultry litter is collected on farms and is sometimes applied directly onto crop lands. Perdue-AgriRecycle's pelleted poultry fertilizer diverts approximately 149,000 tons, or 19 percent, of excess poultry litter from the solid waste stream in Delaware annually. It was estimated that in 1997, the annual production of poultry litter totaled 19.8 million tons, with chickens producing 14.4 million tons and turkeys producing 5.4 million tons.

Conventional alternatives to pelletizing sewage sludge/biosolids as a means of disposal include landfilling, deep sea dumping, and incineration. One biosolid pellet production facility in Quincy, Massachusetts, has the capacity to produce 62,000 dry tons of pellets annually.

b. Technological Feasibility and Performance

U.S. Code Title 7, Chapter 94, which governs organic certification, only applies to agricultural food products. However, it does state that to be certified organic, a farm must not use fertilizers containing synthetic ingredients or any fertilizer that uses phosphorus, lime, or potash as its source of nitrogen. In general, states regulate fertilizers through labeling and permit requirements.

USDA's National Organic Program has developed rules governing organic products, which may be grown with organic fertilizers. However, the program does not apply to the fertilizers themselves. In addition, USDA, pursuant to the recently passed Farm Bill, will be issuing guidelines on biobased products, which would support the use of fertilizers made from plant or animal matter.

The Organic Materials Review Institute (OMRI) has developed guidelines and lists of materials allowed and prohibited for use in the production, processing, and handling of organically grown products. OMRI is a 501(c)(3) nonprofit organization with the mission of publishing and disseminating generic and specific (brand name) lists of materials allowed and prohibited for use in the production, processing, and handling of organic food and fiber.

A contact with the National Park Service (NPS) emphasized the importance of knowing the chemistry of the soil before applying fertilizer. Many times, this will influence the type of fertilizer needed. For example, for much of NPS's land in Washington, DC, the soil is already quite high in phosphorus. Therefore, one of the chemical fertilizers NPS uses has a 18-2-18 analysis, which provides only 2 percent by weight of phosphorus and higher levels of nitrogen and potassium. The contact also added that NPS follows certain general guidelines, such as aerating the soil before applying fertilizer, which reduces nonpoint source runoff if it rains soon after application.

Organic fertilizers have the potential to provide various benefits:

- Improve physical soil properties, either directly or by activating living organisms in the soil.
- Provide better soil structure as a result of soil loosening and crumb stabilization.
- Increase water-holding capacity and soil aeration.
- Enhance uptake and utilization of plant nutrients, which leads to increased pathogen resistance and hardiness.
- Slow the leaching of nutrients from soil, resulting in extended availability through the growing season.

Chemical fertilizers can be a major source of groundwater pollution because the nitrogen is in such a soluble form that it tends to leach from the point of application. Chemical fertilizers can injure plants if they aren't washed or brushed off foliage.

According to one manufacturer of a liquid organic fertilizer made from fish and fish frames obtained from a filleting operation, one-fourth to one-half the total nitrogen per acre should be used when using the fish-based fertilizer compared to the recommended equivalent of chemical fertilizers. However, this high nitrogen property is unique to fish fertilizers. Typically, the nitrogen level of organic fertilizers is lower, so more product must be applied per acre. The same manufacturer states that the gradual release by microorganisms in the soil for plant use provides a much more efficient transfer of nutrients from the fertilizer to the plant, and leaching is virtually eliminated. Furthermore, the company says that the alkaline fraction of the soil will continue to be reduced because organic fertilizers do not utilize salt as a carrier.

As previously mentioned, nitrogen in an organic fertilizer is slow in becoming available for plant use because the nutrient must be reduced by microorganisms before it can be utilized. As such, one potential drawback to organic fertilizers is that they may not release enough of their principal nutrient at a time to give the plant what it needs for best growth. However, because organic fertilizers release their nutrients slowly, it is almost impossible to kill lawns or plants by applying too much, which is not the case with chemical fertilizers.

The contact from NPS indicated that it is possible to find chemical fertilizers that have a high percentage of water-insoluble nitrogen, which is more slowly released than water-soluble nitrogen, mitigating some of the risk of leaching associated with water-soluble nitrogen.

There are some drawbacks associated with certain organic fertilizers. One drawback to cottonseed meal is that there are often harmful residues in the seeds as a result of insecticide applications to cotton. As a result, most organic certification programs prohibit the use of cottonseed meal. Although wood ash can be an effective fertilizer, it may be contaminated with heavy metals or plastic, it often has a high salt

content, it is rather alkaline, and excessive use can be damaging to soils. If not used properly, blood meal can burn plants with ammonia, lose much of its nitrogen through volatilization, or encourage fungal growth. The most significant problem with sludge fertilizer is the heavy metals from industrial waste and the assorted chemical contaminants from various things poured down drains. Contamination by these heavy metals and chemicals makes sludge fertilizers unsuitable for application on food crops. At least 38 states regulate the production of sludge fertilizer and its use is prohibited in all certified organic production.

c. Availability and Competition

There are only a few organic fertilizer companies that operate nationally; most have local or regional sales. According to a contact at the Organic Trade Institute, there are approximately 150 to 200 organic fertilizer manufacturers and another 200 or more companies that manufacture conventional and some organic products. These manufacturers vary in size, products, as well as the markets that they serve.

An organic farmers survey conducted by the Organic Farming Research Foundation in Santa Cruz, California, indicates that more farmers use available on-farm materials, rather than off-farm materials (fertilizers, organic minerals, etc.) as soil amendments. Those who do purchase off-farm materials prefer organic fertilizers and soil amendments to inorganic materials.

The increasing size of poultry facilities and the frequent cleaning out of many poultry operations make poultry manure available in sufficient quantities and on a timely basis to supply most fertilizer production needs. Markets for poultry fertilizer markets are generally local, but there are various manufacturers of poultry fertilizer products operating in different states, including Delaware, Maryland, Arkansas, Indiana, Mississippi, Missouri and Pennsylvania.

d. Economic Feasibility

Organic fertilizers may be more expensive than chemical fertilizers. The contact at Perdue-AgriRecycle indicated that the company's poultry fertilizer is marketed commercially and is priced similar to the general fertilizer market. In particular, blood meal and bone meal are typically very expensive. A contact with the National Park Service (NPS) indicated that the organic fertilizers they use cost $.40 to $.50 per pound, and the chemical fertilizer they use costs only $.20 per pound. Moreover, if a property required a typical application of 45 pounds of nitrogen per acre, it would require 800 pounds of the organic fertilizer vs. 200 pounds of the chemical fertilizer, further increasing the cost. NPS uses both types of fertilizer, but the contact indicated that they are probably more likely than other agencies to use a higher level of organics based simply on the nature of their work.

e. Government Purchasing

Most government agencies would likely purchase fertilizers indirectly via a contracted landscaping service. However, a contact with the National Park Service indicated that an agency is at liberty to specify a particular type or nutrient analysis for any type of fertilizer (organic or synthetic) they would like to use for a particular application. NPS uses mainly two types of organic fertilizer—a product called Milorganite, which is a pelleted form made from biosolids, and Fertile Grow, which is made from poultry litter. The contact said that NPS will almost automatically use organic fertilizers for a special event for which the funding is being provided from outside the agency. For example, for an event on the National Mall, such as the Million Man March, NPS would use organic fertilizer when re-sodding following the event. Still, due to economics, using organic fertilizer for all applications would be cost-prohibited, according to the contact. Their general use fertilizer is a an 18-2-2 chemical fertilizer.

Natural Organic Products International sells some poultry fertilizer to local cities and townships. The State of Florida also plans to purchase some poultry fertilizer for use in median landscaping. One manufacturer of organic fertilizer that EPA contacted sells their product to wholesale distributors, which is then sold to nurseries, golf courses, and gardening stores. Many city Parks and Recreation Departments, such as the Town of Shawnee near Kansas City, are moving towards purchasing more organic fertilizer because they find them safer than chemical fertilizer for children using those parks .

TxDOT is currently purchasing organic fertilizer for use by its Houston District. The organic fertilizer are purchased through local suppliers. A contact at TxDOT indicated that the purchase of organic fertilizer will be increasing in the future.

f. Barriers to Purchasing

According contacts at NPS and the General Services Administration, there are no known requirements or regulations that would prohibit government agencies from procuring organic fertilizers. However, the higher cost of organic fertilizer could likely make them prohibitively expensive for overall use by most agencies.

g. Designation

EPA proposes to designate fertilizers made from recovered organic materials as an item whose procurement will carry out the objectives of section 6002 of RCRA. A final designation would require that a procuring agency, when purchasing fertilizers, procure those that contain recovered organic materials when they meet applicable specifications and performance requirements.

3. Procurement Recommendations

a. Recovered Materials Content

Organic fertilizers contain up to 100 percent recovered materials and can have a mixture of various plant, animal, and mineral content depending on the desired use and the manufacturer.

Most manure-based organic fertilizer pellets contain 100 percent litter, and have no additional products added. There are other animal-based fertilizer pellets, such as those containing fish and bone meal

that use a similar pelletization process. Many of these, however, have additional organic material added, such as feather meal, alfalfa meal, and sunflower seed hull ash.

Poultry fertilizer typically is produced from poultry house litter, which includes the bedding material, manure, feathers, and spilled food. Bedding is used with broiler chickens and turkeys and may be made from sawdust, wood shavings, peanut or rice hulls, or paper. It is organic, but contains minimal nutritional value. A litter base consists of litter with added chemical components, such as urea, sulphate of potash, di-ammonia phosphate, iron, or other chemicals. Third-party companies are often hired to clean farms and then store and dry the poultry litter. This litter can then be purchased by companies for processing into fertilizer.

b. Preference Program

EPA recommends that procuring agencies purchase or use fertilizers made from recovered organic materials in such applications as agriculture and crop production, landscaping, horticulture, parks and other recreational facilities, on school campuses, and for golf course and turf maintenance.

c. Specifications

EPA recommends procuring agencies refer to the Organic Materials Review Institute (OMRI) at <www.omri.org>, which has developed guidelines and lists of materials allowed and prohibited for use in the production, processing, and handling of organically grown products. Procuring agencies should also check for individual state regulations on the use of organic fertilizers.

In addition, as mentioned above, biosolids can be used in the production of organic fertilizer and must meet the requirements specified in EPA's Part 503 Biosolids Rule before they can be beneficially used. The 40 CFR Part 503 Biosolids Rule land application requirements ensure that any biosolids that are land applied contain pathogens and metals that are below specified levels to protect the health of humans, animals, and plants.

In proposing to designate fertilizers made from recovered organic materials in the CPG, EPA is not placing any limitations on the organic materials, but rather is relying on federal, state, and local regulations and guidance, as well as existing industry standards. EPA is requesting comment on whether it should place any limitations on the recovered organic materials contained in the fertilizers that the Agency is today proposing to designate in the CPG, and on what those limitations should be. EPA is also seeking comment and information on any other specifications which we should recommend that pertain to fertilizers made with recovered organic materials.

Finally, EPA recommends that procuring agencies ensure that there is no language in their specifications relating to landscaping or soil that would preclude or discourage the use of organic fertilizers made from recovered organic materials.

VI. ITEMS BEING CONSIDERED FOR FUTURE DESIGNATION

EPA has begun researching and gathering information on the following items. EPA requests information on these items, especially information on recovered content levels and any specifications or standards that might exist for each item.

Asphalt
Computers/Electronics
Industrial Ceramics
Offset Guardrail Blocks
Roofing Sealants
Refuse-derived Fuel

VII. DESIGNATED ITEM AVAILABILITY

EPA has identified a number of manufacturers and vendors of the items proposed for designation. Once the item designations in today's proposal become final, a list of these companies will be placed in the

RCRA docket for this action and will be added to EPA's CPG Supplier Database, which is accessible from the CPG Web site <www.epa.gov/cpg>. This database will be updated periodically as new sources are identified and product information changes. Procuring agencies should contact the manufacturers and vendors directly to discuss their specific needs and to obtain detailed information on the availability and price of recycled products meeting those needs.

Other information is available from the GSA, DLA, state and local recycling offices, private corporations, and trade associations. Refer to Appendix II of this document, for more detailed information on these sources of information.

VIII. ECONOMIC IMPACT ANALYSIS

Details of the economic impact of CPG V are described in the document entitled *Economic Impact Analysis for the Proposed Comprehensive Procurement Guideline V,* which is included in the RCRA Docket for CPG V.

IX. SUPPORTING INFORMATION

"Manure Compost Marketing Guide," Washington State Cooperative Extension, 2002.

"Test Methods for the Examination of Composting and Compost," The U.S. Composting Council, May 2002.

"Managing Nonpoint Source Pollution," U.S. Environmental Protection Agency, 1992.

"Organic Materials Management Strategies," U.S. Environmental Protection Agency, July 1999.

"Agricultural Byproducts—Executive Summary," U.S. Department of Agriculture, May 2002.

Organic Materials Review Institute, <www.omri.org>, 2002.

U.S. Department of Agriculture National Organic Program, <www.ams.usda.gov/nop>, 2002.